REMARKS

Claims 66-69, 72-76, and 78-107 are pending and rejected. By this amendment, Claims 66, 67, 74,83, 87, 88, 101, 106, and 107 have been amended. It is believed that the amendments place the application in condition for allowance.

Independent claims 66, 83 and 106 have been amended to clarify that the protein is a protein solution or slurry to which is added the remaining ingredients of the matrix. The remainder of the amendments were made to dependent claims to conform them to the antecedent language of the independent claims.

35 USC § 112 Rejection

Claim 107 is rejected as indefinite because it depends on non-existent claim 109. Applicants have corrected the dependency of claim 107 to depend from claim 106 thereby obviating the rejection.

35 USC § 103(a) Rejection

All claims remain rejected as unpatentable over Arnold et al. (US Pat. No. 5,324,649), including added claim 101-107, although the Examiner states that the Arnold et al. reference does not include starch.

With respect to the added claims, the Examiner states that "[S]election of particular enzymes, barrier layer and coating materials would be obvious for an artisan to be achieved in a way of ordinary optimization. Further, claims 83, 106 introduce limitation that enzyme matrix constitutes 20=80% by weight of the granule. Arnold teaches that enzyme layer comprises 5-70% by weight of the granules." The Examiner provides no support for his view of "ordinary optimization".

In response to Applicants' arguments of March 13, 2003 that Arnold et al. teach an enzyme fermentation slurry, it is the Examiner's position that:

> Examiner views both "matrix" of the instant invention and "slurry" of the reference at protein mixtures layered around a seed in the described granules. Further, as stated in the rejection, it would be obvious to add to the referenced granules an enzyme protective agents, such as polysaccharide (starch), which is a missing component in the referenced granules compared to the instantly claimed.

In response to Applicants' arguments of March 13, 2003, that the teachings of Arnold in column 7 on adjunct ingredients do not suggest a granule with a matrix of protein, sugar and polysaccharides, it is the Examiner's position that

> Section of the latter [polysaccharides], however, is obvious as the reference suggests using enzyme protective agents, and one of enzyme protective agents commonly used in the art is starch (i.e., a polysaccharide.

The Examiner maintains his position that "any ingredients can be used; their selection would be obvious to an artisan as a process or routine optimization", and that "one of ordinary skills in the art would have been motivated to apply the combined teachings of the references."

Applicants respectfully disagree. The Examiner's statements are unsupported opinions. The Examiner and Applicants agree that starch is a missing component in Arnold et al. granules. Starch also is not specified in the list of adjunct ingredients (Col. 7, lines 48-65). The list of adjunct ingredients does not teach the location for addition of any of the ingredients. The list of adjunct ingredients does not suggest any combination of adjunct ingredients. The Examiner's conclusions are based upon hindsight construction using Applicants' teachings.

Arnold et al. describe only the use of conventional enzyme slurries and conventional "fermentation broth which typically include other proteins, peptide, carbohydrates, other organic molecules and salts". Col. 5, lines 32-37. The enzyme fermentation broth or slurry is then combined with a vinyl polymer or vinyl copolymer, such as PVA, with reduced water solubility in the case of fully hydrolyzed PVA, as described in Col. 5-6 of Arnold el al. This mixture of PVA and fermentation broth/slurry is used to coat a core. Optional ingredients that may be added to the enzyme in Arnold et al. include plasticizers (sugars, sugar alcohols or polyethylene glycols, ureas, dibutyl or dimethyl phthalate, or water) or anti-agglomeration agents (talc, TiO2, clays and amorphous silica). Col. 2, lines 40-45 states that a preferred embodiment of the enzyme layer is "a PVA either alone or in combination with additional agents such as plasticizers or anti-

agglomeration agents". No particular advantage is recited for any of the plasticizers and anti-agglomeration agents.

Other adjunct ingredients may be added to the Arnold et a. enzyme granules, including metallic salts, solubilizers, activators, anti-oxidants, dyes, inhibitors, binders, fragrances, enzyme protecting agents/scavengers such as "ammonium sulfate, ammonium citrate, urea, guanidine hydrochloride, guanidine carbonate, guanidine sulfanate, thiourea dioxide, methylanolamine, diethanolamine, triethanolamine, ".

Properly considering the Arnold et al. reference as a whole, including the examples, leads to a granule having an inert core with or without a PVA coating, a layer of enzyme fermentation broth or slurry with a vinyl polymer, an optional salt layer with or without PVA and TiO2 over the enzyme layer, and a final protective coating layer (TiO2, PVA). The enzyme layer may further contain an optional plasticizer or anti-agglomeration agent. If a plasticizer is added and a sugar happens to be selected from amongst the list of plasticizers, the resulting granule would not have a matrix of protein, sugar and polysaccharide. Then, if additional adjunct ingredients were selected from the list of column 7, and the selection happened to be any of the recited list of enzyme stabilizers, the granule still would not have a matrix of protein, sugar and polysaccharide.

It is the Examiner's position that starch is a known enzyme stabilizer, but Arnold et al.'s list of 10 stabilizers significantly does not include polysaccharides. There is no motivation to look to the other references, such as the '287 and '074 patents, without some teaching of particular benefits to the use of particular stabilizers.

Further, even if an optional polysaccharide were picked out of the list in the '074 or '287 patents for addition to the Arnold et al. granule, the sugar component might not be present since it also is only one of a list of optional ingredients. Even if the unlikely selection of a sugar plasticizer were to be added and a polysaccharide from the '287 or '074 patent were to be added, there still is no teaching to combine the sugar and polysaccharide with the protein to form a matrix as described by Applicants.

Three requirements must be met to make a valid obviousness rejection. First, the prior art relied upon must contain some suggestion or incentive to

modify the reference. Second, the modification must have a reasonable expectation of success determined from the point of those skilled in the art at the time the invention was made. Third, the prior art reference must teach or suggest all of the claim limitations. "It is insufficient that the prior art disclosed the components of the patented device, either separately or used in other combinations; there must be some teaching, suggestion, or incentive to make the combination made by the inventor." Northern Telecom v. Data point corp., 908 F.2d 931, 934.

The selection of the combination suggested by the Examiner is not fairly suggested in the prior art, impermissibly picks and chooses ingredients without considering the inventions as a whole, and looks suspiciously like hindsight reconstruction reached through the teachings of Applicants' disclosure. At best, the analysis is obvious to try.

It is believed that the claims, as currently amended, are in condition for allowance and reconsideration is respectfully requested. If in the opinion of the Examiner a telephone conference would expedite the prosecution of the subject application, the Examiner is encouraged to call the undersigned at (650) 846-4072.

Respectfully submitted,

Date: June 30, 2003

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STATUS OF THE CLAIMS

Claims 1- 65 (cancelled)

66. (Currently amended) A layered granule having a single seed particle, the layers comprising:

a) a protein matrix layered over the seed particle wherein said matrix [includes] comprises a protein solution or slurry [mixed together with a] to which is added a combination of a sugar or sugar alcohol and a polysaccharide structuring agent; and

b) an outer barrier layer or coating.

67. (Currently amended) The granule of claim 66, wherein the protein solution or slurry is mixed together with a sugar.

68. (Previously added) The granule of claim 67, wherein the sugar is selected from the group consisting of glucose, fructose, raffinose, maltose, lactose, trehalose, and sucrose.

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69. (Previously added) The granule of claim 68, wherein the sugar is sucrose.

70. (Withdrawn) The granule of claim 66, wherein the protein is mixed together with a sugar alcohol.

71. (Withdrawn) The granule of claim 70, wherein the sugar alcohol is selected from the group consisting of mannitol, sorbitol and inositol.

72. (Previously added) The granule of claim 66, wherein the polysaccharide structuring agent is selected from the group consisting of starch, modified starch, cellulose, modified cellulose, carrageenan, gum arabic, xanthan gum, locust bean gum, and guar gum.

73. (Previously added) The granule of claim 72, wherein the polysaccharide is a starch or modified starch.

74. (Currently amended) The granule of claim 66, wherein the protein solution or slurry is an enzyme.

75. (Previously added) The granule of claim 74, wherein said enzyme is selected from the group consisting of proteases, amylases, lipases, and cellulases.

76. (Previously added) The granule of claim 74, wherein the enzyme is mixed together with a sugar.

77. (Withdrawn) The granule of claim 74, wherein the enzyme is mixed together with a sugar alcohol.

H1 Cont

78. (Previously amended) The granule of claim 66 having a coating layered over the protein matrix.

79. (Previously added) The granule of claim 78, wherein the coating is selected from the group consisting of polyvinyl alcohol, polyvinyl pyrrolidone, cellulose derivative, polyethylene glycol, polyethylene oxide, chitosan, gum arabic, xanthan and carrageenan.

80. (Previously added) The granule of claim 79, wherein the coating layer comprises a cellulose derivative.

81. (Previously added) The granule of claim 80, wherein said cellulose derivative is selected from the group consisting of methylcellulose, hydroxypropyl methylcellulose, hydroxycellulose, ethylcellulose, carboxymethyl cellulose, and hydroxypropyl cellulose.

82. (Previously added) The granule of claim 66 further comprising a synthetic polymer selected from the group consisting of polyethylene oxide, polyvinyl alcohol, polyvinyl pyrrolidone, polyethylene glycol and polyethylene oxide/polypropylene oxide.

83. (Currently amended) A layered enzyme granule having a single seed particle, the layers comprising:

a) an enzyme matrix layered over the seed particle wherein said matrix is 20 to 80% by weight of the layered granule and comprises [includes] an enzyme solution or slurry mixed together with an added combination of a sugar and a polysaccharide structuring agent, said enzyme solution or slurry selected from the group consisting of proteases, amylases, lipases and cellulases and said polysaccharide structuring agent selected from the group consisting of starch, modified starch, cellulose, modified cellulose, carrageenan, gum Arabic, xanthan gum, locust bean gum, and guar gum; and

b) an outer barrier or coating.

84. (Previously amended) The enzyme granule of claim 83 further comprising a coating layered over the enzyme matrix.

85. (Previously amended) The granule of claim 83, wherein said sugar is selected from the group consisting of glucose, fructose, raffinose, maltose, lactose, trehalose and sucrose.

H1 cont

86. (Previously added) The granule of claim 85, wherein the sugar is sucrose and the polysaccharide is starch or modified starch.

87. (Currently amended) The granule of claim 83, wherein the enzyme solution or slurry is a protease.

88. (Currently amended) The granule of claim 83, wherein the enzyme solution or slurry is a cellulase.

89. (Previously added) The granule of claim 66 wherein a ratio of the sugar or sugar alcohol to the polysaccharide structuring agent in the protein matrix is 0.1 to 90% by weight of the protein matrix.

90. (Previously added) The granule of claim 83 wherein a ratio of the sugar to the polysaccharide structuring agent in the enzyme matrix is 0.1 to 90% by weight of the enzyme matrix.

91. (Previously added) The granule of claim 66 having a barrier layer over the protein matrix layer.

92. (Previously added) The granule of claim 91 wherein the barrier layer is selected from the group consisting of inorganic salts, organic salts, and the combination of the sugar or sugar alcohol and structuring agent.

93. (Previously added) The granule of claim 66 wherein the barrier layer is an inorganic salt.

94. (Previously added) The granule of claim 66 wherein the barrier layer is magnesium sulfate.

H1 coat

95. (Previously added) The granule of claim 83 having a barrier layer over the enzyme matrix layer.

96. (Previously added) The granule of claim 95 wherein the barrier layer is selected from the group consisting of inorganic salts, organic salts, and the combination of the sugar and structuring agent.

97. (Previously added) The granule of claim 83 wherein the barrier layer is an inorganic salt.

98. (Previously added) The granule of claim 83 wherein the barrier layer is magnesium sulfate.

99. (Previously added) The granule of claim 66 having an outer barrier layer over the protein layer and a coating over the barrier layer.

100. (Previously added) The granule of claim 83 having an outer barrier layer over the protein layer and a coating over the barrier layer.

101. (Currently amended) The granule of claim 83 wherein the enzyme solution or slurry is an amylase.

102. (Previously added) The granule of claim 66 wherein the barrier layer is an inorganic salt and titanium dioxide.

103. (Previously added) The granule of claim 83 wherein the barrier layer is an inorganic salt and titanium dioxide.

104. (Previously added) The granule of claim 66 having a barrier layer and a coating.

105. (Previously added) The granule of claim 83 having a barrier layer and a coating.

H1 cont

106. (Previously added) A layered granule comprising:

a) a single seed particle;

a) an enzyme matrix layered over the seed particle wherein said matrix includes at least one enzyme solution or slurry mixed together with an added combination of a sugar and at least one polysaccharide structuring agent and constitutes from about 20 to 80% by weight of the layered granule;

b) a barrier salt layered over the enzyme matrix layer; and

c) an outer coating over the barrier layer.

107. (Currently amended) The layered granule of claim 10[9]6 wherein the sugar is sucrose; the polysaccharide structuring agent is one or more starches, the barrier salt is magnesium sulfate, and the outer coating is selected from one or more of polyvinyl alcohol, titanium dioxide and a surfactant.